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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,658	02/23/2004	Sang-Jin Park	21C-0093	2674
23413	7590	10/03/2006	EXAMINER SCHECHTER, ANDREW M	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			ART UNIT 2871	PAPER NUMBER

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/785,658

Applicant(s)

PARK ET AL.

Examiner

Andrew Schechter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) 12-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 11, 17 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 June 2006 has been entered.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Response to Arguments

3. Applicant's arguments filed 13 June 2006 have been fully considered but they are not persuasive.

The applicant argues [p. 8] that none of the cited references teach a number of the light sensing portions being smaller than a number of the pixel portions in a unit area (as recited in claim 1 now, and previously in claim 9). This is not persuasive. *Hack* does teach this, saying "in certain circumstances it may be desirable to locate sensing apparatus not in every cell but in, say, every other cell" [col. 11, lines 53-55], as

noted in the previous office action. Also, when "blue-filtering" or "red-filtering", the sensing portions are in (at most) only a third of the pixels, as noted in the previous office action.

The applicant argues [p. 8] that none of the cited references teach the light sensing portions each having a size smaller than a size of the respective pixel portions (as recited in claim 1 now, and previously in claim 10). The applicant notes that the figures in the references *Shannon* and *Hack* cannot be taken as being drawn to scale (a point made previously by the examiner), and notes that there is no explicit statement in *Hack* that the light sensing portions are smaller than the respective pixel portions. This argument is not persuasive, for reasons which depend on the claim interpretation. As discussed previously, *Wu* discloses the light sensing portions being a fraction of the pixel size, and it would have been obvious to one of ordinary skill in the art at the time of the invention to have it so in *Hack*. The examiner notes that there appears to be a claim interpretation problem related to this argument, so this discussion is continued below under 35 USC 112.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-7, 11, 17, and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the term “pixel portions” and there does not appear to be an explicit definition of the term. The examiner, up to this point, has assumed that the term was synonymous with “pixel region”, and meant an area defined by neighboring gate and data lines. Thus, the display region is divided into a plurality of pixel portions, and (except for the edges of the screen) there is no area (except perhaps that covered by a black matrix) which does not correspond to a “pixel portion”. Thus, since the light sensing portions correspond to individual pixels, they must have a size equal to or smaller than the respective pixel portions, and “equal to” would be difficult to arrange.

However, the examiner notes that it is possible that the applicant means the term “pixel portion” to refer only to that area of each pixel region in which a display is created; for instance, the region covered by a pixel electrode. Thus, for LCDs with the standard rectangular-shaped pixel electrode, the last limitation in claim 1 would be equivalent to “the light sensing portions each have a size smaller than a size of the respective pixel electrodes”. Using this interpretation, the applicant’s arguments about the *Hack* and *Shannon* references being silent, and the figures not being drawn to scale, are reasonable; the examiner has not previously made a case for the light sensing portions being smaller than the respective pixel electrodes. (The examiner does so below.)

Clarification as to the intended meaning of the term is required. For examining purposes, it is assumed that the latter meaning is intended.

Claims 2-7, 11, 17, and 18 depend on claim 1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 7, 11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Hack et al.*, U.S. Patent No. 5,204,661 in view of *Shimada et al.*, U.S. Patent No. 5,910,829, and further in view of *Street et al.*, U.S. Patent No. 5,920,401.

Hack discloses [see Fig. 2, for instance] a display device for displaying images in response to image and control signals, comprising, a display surface [inherent] through which input light [col. 11, lines 20-44] is applied from an external object ["light pens", for instance]; a color filter having color pixels that are arranged to form a planar surface substantially parallel with the display surface and a substrate [inherent] including a plurality of pixel portions, a least one light sensing portion [12] disposed to face corresponding one of the color pixels, the at least one light sensing portion sensing light provided through the color pixel [col. 11, lines 20-44], the at least one light sensing portion including multiple light sensing portions each of which is disposed at an area having a selected number of the pixel portions [for instance, 1 or 2 pixel portions, see col. 11, lines 53-55], wherein the number of light sensing portions can be smaller than a number of pixel portions in a unit area [when they are arranged "in, say, every other

cell”, see col. 11, lines 53-55, then a unit area of 2 pixel portions contains 1 light sensing portion and 2 pixel portions].

Hack does not disclose the color pixels including red, green, and blue color pixels. *Shimada* discloses [see Figs. 16-19] an analogous device in which the color filter has red, green, and blue pixels. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the color filter of *Shimada* in the device of *Hack*, motivated by the well-known use of these three types of color pixels to create full-color images and *Shimada*’s teaching that its color filter substrate conveniently provides light blocking [see abstract].

Hack does not explicitly state that the at least one light sensing portion corresponds to a red color pixel. *Hack* teaches that

“by placing a color filter over individual sensors... it would be possible to selectively sense light of particular wavelengths. By blue filtering a pixel, for instance, the pixel will become relatively insensitive to red light input. This may be valuable in digitizing color images, distinguishing between different “color” light pens in a multi pen system, or other application where color differentiation is important.” [col. 11, lines 20-44]

Thus, *Hack* explicitly states the example of a blue color pixel corresponding to the at least one light sensing portion. However, in its use of “for instance”, in referring to “different ‘color’ light pens”, and insofar as there are only three primary colors red, green, and blue, this passage also clearly gives explicit fruition to red filtering a pixel. At the very least, it would have been obvious to one of ordinary skill in the art at the time of the invention to red filter a pixel, based on *Hack*’s teaching that it would be valuable in

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digitizing color images, in using a multi-pen system, etc. The examiner notes that when red-filtering, the light sensing portion is only at 1 in 3 pixel portions, so the number of light sensing portions is smaller than a number of the pixel portions in a unit area.

Hack also does not disclose wherein further, the light sensing portions each have a size smaller than a size of the respective pixel portions. As discussed above, the examiner now interprets this to mean, in the context of *Hack*, that the light sensing portion is smaller than the respective pixel electrode, rather than smaller than the respective pixel area [which would be met as discussed in the previous office action]. *Hack* appears to be silent on the relative sizes of the light sensors and the pixel electrodes. *Street* discloses an analogous device, combining an LCD and an image sensor [see Fig. 5, for instance, col. 7, lines 1-37], and teaches the benefit using high sensitivity sensors, so that “a sensor size of no more than 10x10 microns is needed, and the sensor array can be a small fraction of the pixel size” [col. 7, lines 29-37]. This clearly benefits the display in that having a large pixel size and small sensor size improves the aperture ratio of the display device. *Street* further states that the “high sensitivity simplifies the readout electronics” [col. 7, line 37]. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the light sensing portions be highly sensitive and smaller than the pixel portion size as in *Street*, motivated by the desire for high aperture ratio and by *Street*’s teaching that this improves the readout electronics.

Claim 1 is therefore unpatentable.

Regarding claim 2, *Hack* discloses a liquid crystal layer over the substrate [col. 5, lines 50-51] and a color filter [col. 11, line 25], but does not specifically disclose that the liquid crystal is between the color filter and the substrate [that is, the color filter and the substrate could both be on the same side of the liquid crystal rather than as recited].

Shimada discloses [see Fig. 1, for instance] an analogous LCD with the substrate having the TFT circuitry and the color filter substrate on opposite sides of the liquid crystal. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the device of *Hack*, motivated by the manufacturing advantage of being able to produce the substrate with the circuitry and a separate substrate with the color filters, as is conventionally done in the art, thus allowing use of existing facilities and processes. Claim 2 is therefore unpatentable.

When red-filtering a pixel, red light is provided to the at least one light sensing portion only through the red color pixel, so claim 3 is also unpatentable. The plurality of pixel portions are arranged in a matrix form to display images in accordance with the image [Ds] and control [An] signals, so claim 7 is also unpatentable. There is a gate line [An], a data line [Ds], a first switching member [40] having a conduction path between the data line and a pixel electrode [the electrode on the TFT side of 42], the first switching member being controlled by the gate signal, so claim 11 is also unpatentable. Each of the color pixels in *Shimada* has a stripe shape extended in a predetermined direction between opposite ends of the color filter, so claim 18 is also unpatentable.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hack*, *Shimada*, and *Street* as applied above, and further in view of *Matsumoto et al.*, U.S. Patent No. 4,097,128.

Hack and *Shimada* do not explicitly disclose that the red light has a wavelength range from about 600nm to about 700nm. *Matsumoto* discloses [col. 20, lines 1-2] that this wavelength range produces a distinct red light. It would have been obvious to one of ordinary skill in the art at the time of the invention to use this range of wavelengths, motivated by the desire to produce a distinct red light. Claim 4 is therefore unpatentable.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hack*, *Shimada*, and *Street* as applied above, and further in view of *Cook*, US 2002/0021291.

Hack in view of *Shimada* does not explicitly disclose having the external light be white (a functional limitation as this does not affect the structure of the display device). *Cook* discloses a stylus (light pen) for such an LCD, and discloses that the LED generating the light for this stylus may be white [paragraphs 0028-0030]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use white light, since some of the light would therefore be able to pass through red, green, and blue color filters and reach the respective light sensing portions. Claim 5 is therefore unpatentable.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hack*, *Shimada*, and *Street* as applied above, and further in view of *Matsumoto et al.*, U.S. Patent No. 4,097,128.

Hack discloses that the input light from the external object can be red (for instance, when red filtering in a multi-pen system, as discussed above), but does not explicitly disclose that the red light has a wavelength range from about 600nm to about 700nm. *Matsumoto* discloses [col. 20, lines 1-2] that this wavelength range produces a distinct red light. It would have been obvious to one of ordinary skill in the art at the time of the invention to use this range of wavelengths, motivated by the desire to produce a distinct red light. Claim 6 is therefore unpatentable.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hack*, *Shimada*, and *Street* as applied above, and further in view of *Huang et al.*, U.S. Patent No. 6,099,185.

Hack discloses [col. 11, lines 31-32] having the external object be a light pen, but does not explicitly disclose it having a light emitting diode [LED] to generate the input light. *Huang* discloses a color light pen such as that referred to by *Hack*, in which the light is generated by LED [see abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the device of *Hack*, motivated by the ability of such LED chips to generate the appropriately-colored lights in a small, light-weight pen-holder to facilitate the convenient usage of the light pen. Claim 17 is therefore unpatentable.

Election/Restrictions


12. Claims 12-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 11 August 2005.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Nelms can be reached at (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
Primary Examiner
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28 September 2006